



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/817,338

04/01/2004

Franz Mathe

4648

3277

21553

7590

07/26/2005

FASSE PATENT ATTORNEYS, P.A.

P.O. BOX 726

HAMPDEN, ME 04444-0726

EXAMINER

PIZARRO CRESPO, MARCOS D

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/817,338

Applicant(s)

MATHE ET AL.

Examiner

Marcos D. Pizarro-Crespo

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 8-17, 22, 27 and 28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 18-21 and 23-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-28 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/6/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Application/Control Number: 10/817,338 (Non-Final Rejection)
Art Unit: 2814

Page 2

Attorney's Docket Number: 4648

Filing Date: 4/1/2004

Claimed Foreign Priority Date: 5/15/2003 (DE 103 21 954.4)

Applicant(s): Mathe, et al.

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the election filed on 6/27/2005.

Election/Restrictions

1. Applicant's election without traverse of claims 1-7 and 18-26 as reading on species 1 in the reply filed on 6/27/2005 is acknowledged. Claim 22, however, fails to read on species 1. As indicated in the restriction requirement mailed on 6/1/2005, species 1 reads on figures 1 and 3. Figures 1 and 3 show the solder contacts having different shapes, *i.e.*, circular and oblong. Claim 22, on the other hand, recites that the two contacts have the same shape. Accordingly, claims 8-17, 22, 27, and 28 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant's indication of claims 1-7, 18-20, and 23-25 as generic to all species, and of claim 21 as generic to species 1 and 3 is also acknowledged.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claims Rejection

3. Initially, and with respect to claims 5-7, note that a "product by process" claim is directed to the product *per se*, no matter how actually made. See *In re Thorpe*, 227 USPQ 964 (CAFC, 1985) and the related case law cited therein which makes it clear that it is the final product *per se* which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. As stated in Thorpe,

even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington*, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969); *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935).

Note that the applicants have the burden of proof in such cases, as the above case law makes clear.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 2, 4-7, 18-21, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue (US 6333522) in view of Spratt (US 5900654).

7. Regarding claim 1, Inoue shows (see, e.g., figs. 7A and 7B) most aspects of the instant invention including a single semiconductor element, in particular a diode, comprising at least:

- ✓ A substrate layer **30** at a rear side of the semiconductor element
- ✓ An active layer **33** between the substrate layer **30** and a contact side of the element opposite the rear side
- ✓ Two solder contacts **24/25a** electrically connected to the active layer **33** and projecting beyond the contact side of the element in order to make possible a direct soldering of the element to a carrier board (see, e.g., fig. 29)

wherein the contact side is provided with a protective layer **39** that peripherally surrounds the contacts (see, e.g., fig. 7B). Inoue, however, fails to specify that the protective film is a glass passivating layer. Spratt, on the other hand, uses a glass

passivating film similar to Inoue's protective film to protect the front surface of a semiconductor element (see, e.g., Spratt, col.10/ll.3-5, col.14/ll.38-40, and col.16/ll.13-15).

It would have been obvious at the time of the invention to one of ordinary skill in the art to use the glass passivating film of Spratt as Inoue's protective film to protect the front surface of the semiconductor element.

8. Regarding claim 2, Inoue (see, e.g., fig. 9A) shows the passivating layer **39** is interrupted in the region of the contacts **24/25a** and in the region of a dividing grid **37** between semiconductor elements produced adjacently.

9. Regarding claim 4, Inoue shows the solder contacts **24/25a** are connected to the active layer via an intermediate metal layer **5/6** (see, e.g., fig. 7B).

10. Regarding claims 5-7, it is noted that Inoue/Spratt show all structural aspects of the semiconductor element according to the claimed invention (see, e.g., paragraph 7 above) and that the steps recited in claims 5-7 are intermediate method steps that do not affect the structure of the final device.

11. Regarding claim 18, Inoue shows the solder contact have different outlines (see, e.g., fig. 7A).

12. Regarding claim 19, Inoue shows the shape of the respective outlines is different (see, e.g., fig. 7A).

13. Regarding claims 20, 21, and 26, Inoue/Spratt show most aspects of the instant invention (see, e.g., paragraphs 7 and 11 above). Inoue also shows one **24** of the two solder contacts having a circular outline and the other **25a** having an elongated outline,

Art Unit: 2814

each of them having a certain area and perimeter at the contact side. Inoue, however, fails to specify that the areas or the peripheral length of the contacts are the same. It is also noted that the specification fails to provide any teachings about the criticality of having contacts with the same area or perimeter. It has been held that differences in dimensions will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such dimensions are critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Since the applicants have not established the criticality (see next paragraph) of the claimed areas or perimeters, it would have been obvious to one of ordinary skill in the art to use these values in the device of Inoue/Spratt.

CRITICALITY

14. The specification contains no disclosure of either the critical nature of the claimed areas or perimeters or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

15. Regarding claim 24, Inoue shows at least one **25a** of the two solder contacts is made in a plurality of parts at the contact side of the single semiconductor element (see, e.g., fig. 7A).

16. Regarding claim 25, Inoue shows at least one **25a** of the two contacts extending along one of the outer edges of the contact side of the semiconductor element (see, e.g., fig. 7A).

17. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue/Spratt in view of Goto (JP 56-33845).

18. Regarding claim 3, Inoue/Spratt show most aspects of the instant invention (see, e.g., paragraph 7 above), except for an oxide layer between the glass passivating layer and the active layer. Goto (see, e.g., abstract), on the other hand, teaches that providing said oxide layer would improve the passivating property of the passivating layer.

It would have been obvious at the time of the invention to one of ordinary skill in the art to provide an oxide layer between the glass passivating layer of Inoue/Spratt and the active layer, as suggested by Goto, to improve the passivating property of the passivating layer.

19. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue/Spratt in view of Farnworth (US 2003/0032217).

20. Regarding claim 23, Inoue/Spratt show most aspects of the instant invention (see, e.g., paragraphs 7 and 11 above), except for at least one dummy contact provided in addition to the two solder contacts to increase standing stability. Farnworth (see, e.g., par. 0066), on the other hand, teaches that providing dummy contacts would prevent tipping or tilting of Inoue/Spratt's semiconductor element relative to the carrier board.

It would have been obvious at the time of the invention to one of ordinary skill in the art to provide Inoue/Spratt's semiconductor element with the dummy contacts

Art Unit: 2814

suggested by Farnworth to prevent tipping or tilting of the semiconductor element relative to the carrier board.

21. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakura (US 6127720) in view of Harper.

22. Regarding claim 1, Nakura shows (see, e.g., fig. 7) most aspects of the instant invention including a single semiconductor element, in particular a transistor, comprising:

- ✓ A substrate layer **2** at a rear side of the element
- ✓ A contact side of the element disposed opposite the rear side
- ✓ An active layer **3** between the substrate layer **2** and the contact side
- ✓ Two contacts **10/11** electrically connected to the active layer **3** and projecting beyond the contact side of the element
- ✓ A glass passivating layer **9** peripherally surrounding the contacts **10/11** at the contact side

Nakura, however, fails to show the semiconductor element in a flip chip construction wherein the two contacts make possible a direct soldering of the semiconductor element to a carrier board. Harper, on the other hand, teaches that flip-chip technology uses soldering directly between a semiconductor element and a carrier substrate (see, e.g., pp.10.49/II.23-25). Since it does not use bonding wires or leads, interconnection conductor lengths can be minimized and circuit performance maximize (see, e.g., pp.10.49/II.26-29).

It would have at the time of the invention to one of ordinary skill in the art to use Nakura's semiconductor element in a flip chip construction wherein the two contacts make possible a direct soldering to a carrier board, as taught by Harper, to maximize circuit performance.

23. Regarding claim 3, Nakura shows an oxide layer **5** between the glass passivating layer **9** and the active layer **3** (see, e.g., fig. 7).

Conclusion

24. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

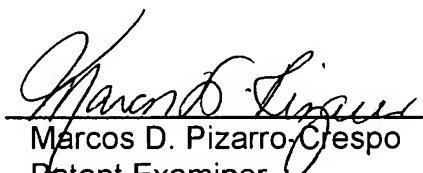
26. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or

Art Unit: 2814

Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

27. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/81,91,99,778	7/19/2005
Other Documentation:	
Electronic Database(s): EAST (USPAT, EPO, JPO)	7/19/2005


Marcos D. Pizarro-Crespo
Patent Examiner
Art Unit 2814
571-272-1716
marcos.pizarro@uspto.gov